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## Operating my Shack Remotely

How I use my home Shack remotely

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## Scope and Why?

- The scope of this presentation is accessing your personal shack by yourself. Not a shared resource for use by a club etc....
- From within your home
  - Don't need to be in your shack, operate from the sofa, garden, bedroom, bath?
- Whilst away from home
  - If you travel for work, nights in hotels, on holiday, “work”, mother in laws etc.
- Never need miss an opening or rare activation
- Warning...Not a cure for insomnia.



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# Challenges to consider

How diverse is the range of equipment you want to access?

- Multiple brands of radio?
- Different antennas?
- Rotator?
- Different modes, CW, Data etc., Power Amps?

Safety and licensing considerations

- Must be able to power it all down remotely
- Ideally disconnect antennas when not used
- Internet security if accessing remotely
- What platform do you want to use (PC, Mac, iPad...etc)



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## Options Considered

- There are brand specific Remote control software packages
  - Icom RS-BA1, Yaesu SCU-LAN10, Elecraft K3/K4, Flex SmartLink etc..
- There are generic Remote Radio Control software packages
  - RemoteRig, HamRadioDeluxe, RCForb, WFView
- You could just remote access your home PC that has the radio attached
  - RDP, TeamViewer etc.. (there are many)



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# My Preference/Choice

- Many packages provide great remote control for basic operation but have problems when wanting to use specific data modes remotely.
- I wanted a minimalist solution for convenience
- I opted for an iOS app (for iPhone and iPad) by Marcus DL8MRE.
  - Versions that support Icom, Kenwood, Yaesu, Flex ....
  - Extensive support including integrated logging, FT8, CW etc.
- Connect direct to Radio – no PC/Micro involved
- I Complimented that with other in-shack solutions for power etc.





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# Networking – a quick course

- Whether at home or away you want to aim for:
  - Minimal packet loss, good ping times.
  - Poor connectivity can affect quality of audio and digital mode errors.
  - You don't actually need super fast connections, I have operated at very slow speeds of just a few Mbps, so long as its consistent and uninterrupted.
- If you're operating away from home
  - Need to allow connection through your firewall.
  - Outside of many peoples comfort zone. Ask a friend.
  - Risky if you're unsure !



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# Networking – IP Addresses

- Your network connected devices, PC, Radio etc... will have a unique (to your home) IP address. You will need to know these.
- By default IP addresses are allocated by your router, and can change, so it is good to give them a fixed IP.
- It is safer to 'reserve' an IP for the important devices using the Router. This way the router prevents anything else being given the same IP, which would be bad.
- Once you have fixed the IP of the device, make a note for use in the remote software etc.



# IP Addresses Reservation

The screenshot shows the TP-Link web interface for IP Address Reservation. The sidebar on the left contains the following navigation items:

- ▶ Status
- ▶ Quick Setup
- ▼ Network
  - WAN
  - LAN
  - IPTV
  - MAC
  - Switch
  - VLAN
  - IPV6
  - USB
- ▶ Preferences
- ▶ Transmission
- ▶ Firewall
- ▶ Behavior Control
- ▶ VPN
- ▶ Authentication
- ▶ Services
- ▶ System Tools

The main content area is titled "Address Reservation" and contains a table with the following data:

<input type="checkbox"/>	ID	MAC Address	IP Address	Description	Status	Operation
<input type="checkbox"/>	1	<input type="text"/>			Enabled	
<input type="checkbox"/>	2	<input type="text"/>			Enabled	
<input type="checkbox"/>	3	<input type="text"/>			Enabled	
<input type="checkbox"/>	4	00-90-C7-0E-E7-A5	192.168.0.139	IC705	Enabled	
<input type="checkbox"/>	5	00-01-25-01-38-CE	192.168.0.50	YAESU	Enabled	
<input type="checkbox"/>	6	00-90-C7-0B-E7-63	192.168.0.110	IC-9700	Enabled	
<input type="checkbox"/>	7	D8-BC-38-AB-E9-A3	192.168.0.70	ROTATOR	Enabled	
<input type="checkbox"/>	8	DC-84-03-2D-5E-50	192.168.0.86	FlashForge 5M Pro	Enabled	
<input type="checkbox"/>	9	10-20-BA-44-98-BC	192.168.0.69	esp32 Antenna Swich	Enabled	

- Look for a feature called Address Reservation, usually under LAN settings. AI is your friend.



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# Remote Internet Access Connection Options

- Option 1 – Port forwarding
  - Open the required ports used by the software and use DMZ/Port forwarding to direct them to your radios IP address.
  - No security – anyone can access those ports if they find them, and they will find them. But you radio has it's own security, and is unlikely to be a target of hackers, there is nothing to gain. But your PC etc.. Is another story!
  - Tricky if you have multiple devices (radios) using the same port numbers.
- Option 2 – VPN (my preference)
  - Configure your own VPN on your home firewall
  - More secure
  - Provides access to all your home devices 'as if you were at home'



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# Remote Internet Access – IP Addressing

- It is likely your home internet is not a fixed IP address
  - Your IP will change – so how can you configure the remote connection?
- If your provider offers fixed IP then use that option, much easier.
- Otherwise use a Dynamic DNS service DDNS (like NO-IP)
  - Gives your address a “Name” that remains the same even if address changes
  - Check your router settings, look for ‘Dynamic DNS’
  - See what providers it support, e.g. NO-IP
  - Compare them, usually ‘free’ versions to use, and create an account
    - E.g. `yourname.ddns.net`
  - Configure your router with the account settings.
  - Your router will ‘inform’ the service if your ip changes
  - You use the dns name `yourname.ddns.net` to connect instead of an IP address.



# Home VPN

- Example DDNS config on my tp-link router

The screenshot shows the TP-Link router's web interface. The top navigation bar includes 'Status', 'Peanuthull', 'Comexe', 'DynDNS', and 'NO-IP'. The left sidebar lists various settings: 'Quick Setup', 'Network', 'Preferences', 'Transmission', 'Firewall', 'Behavior Control', and 'VPN'. The main content area is titled 'NO-IP' and contains a table of DDNS configurations. There are '+ Add' and '- Delete' buttons above the table.

<input type="checkbox"/>	ID	Interface	Account Name	Update Interval	Status	Service Status	Domain Name	Operation
<input type="checkbox"/>	1	WAN	<input type="text"/>	1 hour	Enabled <span style="color:red">✖</span>	Online	<input type="text"/> .ddns.net	<input type="checkbox"/> <input type="checkbox"/>

The screenshot shows a detailed configuration dialog for a DDNS entry. It includes fields for 'Interface' (set to WAN), 'Account Name', 'Password', 'Domain Name' (set to .ddns.net), and 'Update Interval' (set to 1 hour). The 'Status' checkbox is checked. There are 'OK' and 'Cancel' buttons at the bottom.

<input type="checkbox"/>	ID	Interface	Account Name	Update Interval	Status	Service Status	Domain Name	Operation
<input type="checkbox"/>	1	WAN	mSatz	1 hour	Enabled	Online	g6gal.ddns.net	---

Interface: WAN  
Account Name:  ✖ [Go to register](#)  
Password:  ✖  
Domain Name: .ddns.net  
Update Interval: 1 hour  
Status:  Enable  
OK Cancel



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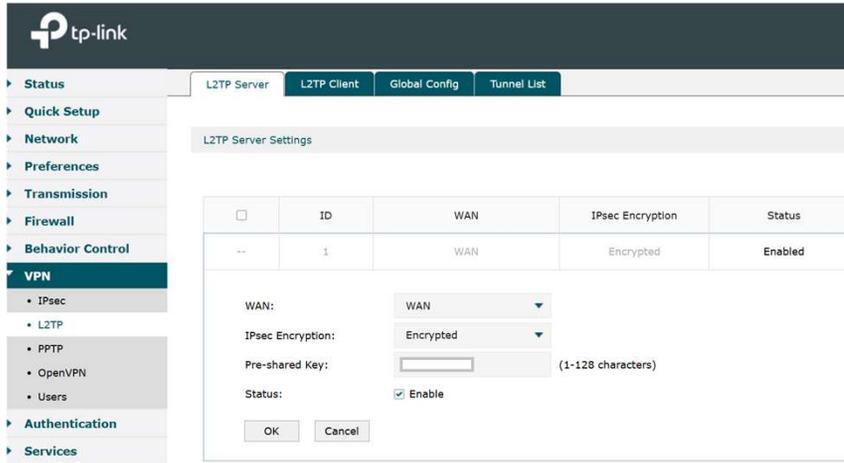
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# Home VPN

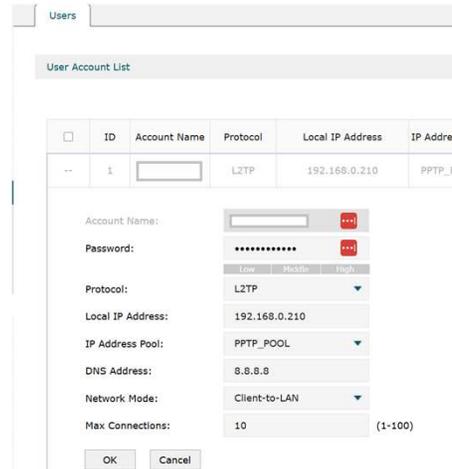
- This will depend largely on your make/model of Router.
- The principles will be the same. AI will help you.
- Look for the VPN option in your router config
- I use L2TP as it's relatively easy to config and relatively secure, if used with Ipsec Encryption.
- You will need to create a L2TP Server with a pass key (pre shared key).
- Then create a login account/user with some credentials.
- Then install a VPN Client on your remote devices (Phone/iPad etc.)



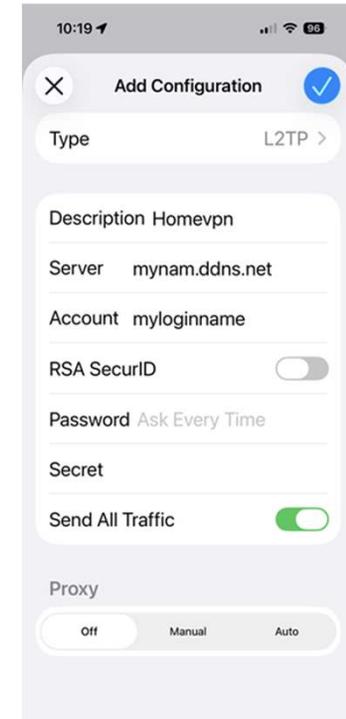
# Home VPN



1) Configure the VPN Server side, with pre-shared key



2) Define a user account with name and password



3) Configure the client

4) Connect to the VPN client, entering password, before using the radio etc...

You can now access any devices in your home using their internal IP addresses etc..



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# Power Control

- We want to turn on/off devices remotely for obvious reasons.
- There are many low-cost options for this.
- I use a Tapo power strip which allows me to control 4 devices in the shack, there are many other options.



From my phone I can turn on/off

- PC
- FT-DX10 PSU & remote Antenna control
- IC9700/7300 PSU
- Rotator

You can also install a camera in the shack and view your station etc. using the same App.



# Antenna Isolation

It is a good idea to disconnect antennas when not in use to help protect from ESD etc. Nothing is going to save you from a lightning hit, but increasing the separation between the radio and antenna can't be a bad thing.

I built this antenna isolator that isolates both the coax inner and outer when powered off, it provides an air gap of between 2-3mm between the antenna coax and anything in the shack. Not perfect but everything helps right?

Features :

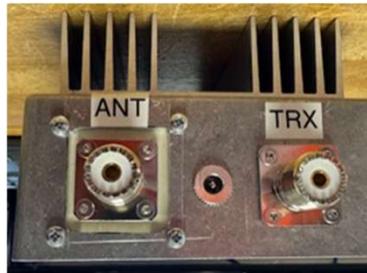
- Antenna coax isolated on power off (both inner and outer)
- Antenna coax inner/outer shorted on power off
- Can provide BiasT power to power up remote ATU
- Shack side of coax connected to 100W Dummy load when powered off.



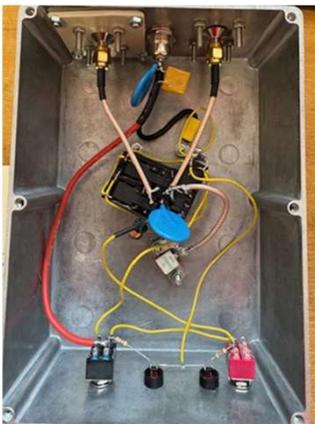
# Antenna Isolation



Heatsink for the 100W dummy load resistor (a bit big)



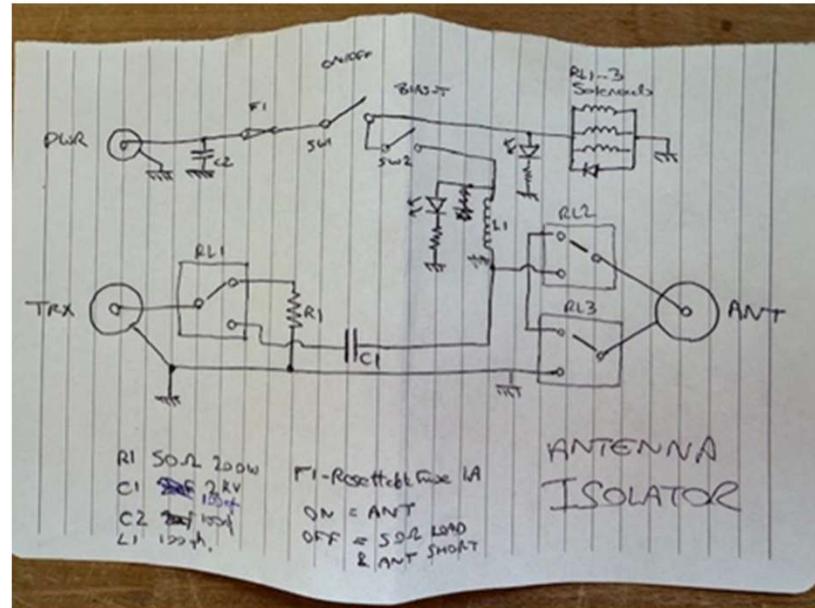
The isolation of inner **and** outer on the antenna side.



3 Relays – fed with coax from the connectors, all RF leads kept short. Negligible insertion loss/SWR impact on HF/6M.

A flange mount 50 Ohm 100W resistor switched in for the dummy load.

Simple inductor/capacitor BiasT circuit, switched.



'Back of fag packet' design. Hopefully clear enough. R1 is the 50 Ohm dummy load, C1 isolates the BiasT voltage, L1 is the BiasT inductor. Relays shown in powered off state.

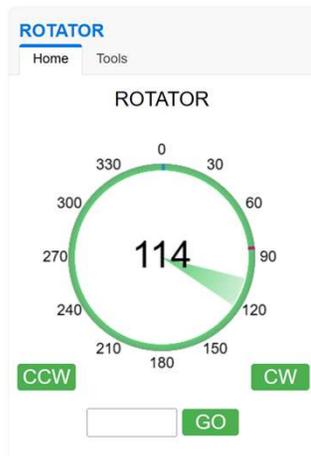


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# Rotator Control

I have a Yaesu G450DC rotator which I wanted to control remotely as I usually have 6m Yagi attached in the 'open season'.

I found this simple low cost Arduino based controller by AF6SA that allows easy interfacing and provides a web-page to control the rotator. It also allows control from PSTRotator etc. and accepts Yaesu rotator commands over IP. It supports a huge range of Rotators and will even work with your home made stuff...



**ROTATOR**

Home Tools

---

**Rotator Settings**

UDP Control Port:

Web interface update interval:  [ms]

Acceleration time:  [ms]

Decelerate point:  [deg]

Max. rotating time:  [s]

Stall detect time:  [s]

Braking time:  [s]

AUX relay function:

QRA Locator:

Elevation rotator:

Pot. wired as rheostat:

---

**Calibration Settings**

State: **idle**

ADC reading: (0..1023) **132**

---

Pot. Source resistance:  [Ohm]

Pot. Minimum resistance:  [Ohm]

Pot. Maximum resistance:  [Ohm]

ADC min: (0..1023)  [adc]

ADC max: (0..1023)  [adc]

Rotation: (1..450)  [deg]

ANT offset: (0..359)  [deg]

Direction invert:

Calculated heading: **116**



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# Antenna Control etc..

I have a selection of radios and antennas I use in different scenarios:

- IC-7300 – My normal in shack use radio, has no network connectivity – use on HF/6m
- IC-9700 – Used for general 2m/70cm and sometimes QO-100 operating. Networked.
- FT-DX10 – I use for remote access on HF/6m. Networked via SCU-LAN10 interface.
- IC-705 – Sometimes used in shack, connectable by Wifi
- HF Vertical at bottom of garden with Remote ATU powered by BiasT.
- Mast with Rotator and Yagi which is interchanged between 6m/2m/70cm etc..
- Satellite Dish/up-down converter for QO100
- White Stick vertical for 2/70.
- Dummy load.
- I wanted to select which radio/antenna to use remotely so I could (for example) switch between HF and 6m, or toggle between white stick and QO100 on the 9700 etc.
- I wanted to **control the power** to the ATU, QO100 box, a biasT for masthead amp and the IC705.
- I could not find an off-the shelf solution for this, so had to make my own 😊



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# Antenna Control solution..

The solution was to make my own antenna controller, based on an ESP32 microcontroller and some multi-way coax switches. This took about 9 months to complete, including the software. It's features are:

- Switch 1 of 6 antennas to 1 of 6 radios/devices
- Configurable device names so can change how I use it.
- Secondary by-pass to allow the 9700 to be left on the white stick when not wanted elsewhere.
- 4 switchable relay outputs for powering 12v devices
- Touch screen for use in shack
- Web site for remote control

It works well. The coax relays are good to at least 70cm 100W, in theory they are good to 18Ghz but at lower powers. Negligible insertion loss or affect on SWR, and 60db Isolation (120 of course because 2 are used).

Not for the feint hearted, especially the coding, but can share more on this later if anyone interested.



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# Antenna Control solution..



Touch panel in the shack. Just touch to select each radio/antenna. Sliders for the power to devices.

**G6GEI Shack Controller**  
Control Config

**Antenna Selection**

**First Radio Selection**

**Second Radio (at same time) option**  
 STICK to IC-9700

**DC Power Relays**  
 ATU Power  
 QO100 Box  
 9700 BiasT  
 IC-705

**ROTATOR**  
Home Tools

ROTATOR

CCW CW

GO

The website interface.  
Note I included the rotator control on the same page so only need to load one page to control both.

**G6GEI Shack Controller**  
Control Config

**WiFi Settings**

SSID: TRACELANDS  
 Password: .....

Show password

**Radio & Antenna names**

Radio 1: IC-7300	Antenna 1: HF+ATU
Radio 2: FT-DX10	Antenna 2: YAGI
Radio 3: IC-705	Antenna 3: DUMMY
Radio 4:	Antenna 4:

Devices can be renamed.



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# Tuning and CW Paddle

MIDI Controller

Connects via USB or BlueTooth.

Tuning dial

6 Programmable buttons

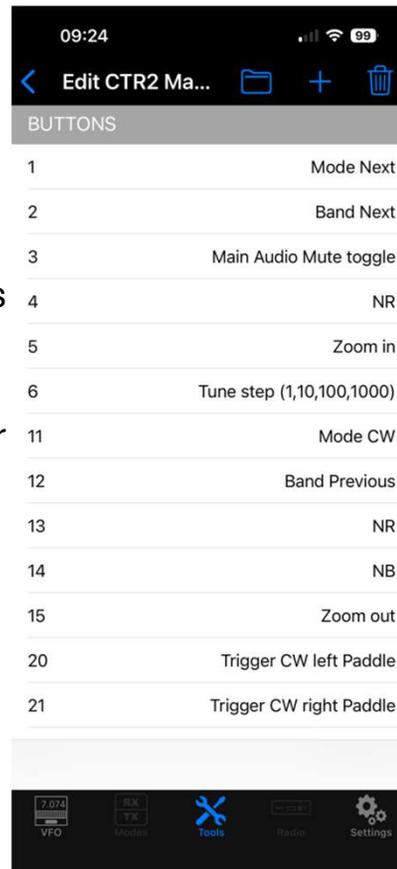
Jack input for Paddle

\$70 assembled, used to be available as a kit.

Can connect to phone/tablet directly or via USB Hub or via BlueTooth.

Do not expect a straight CW Key to work with this software!

Do not expect CW to work through Yaesu SCU-Lan10!



# The Software

Saving the best till last

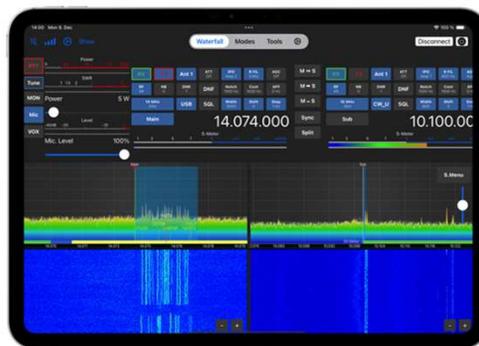
It is hard to write this without it reading like a promotion for the software, but it really is awesome!

<https://ham-radio-apps.com/>

Runs on macOS and iOS and supports Flex, Icom, Yaesu, Kenwood, Elecraft  
You can look at the website, but just for starters:

- Full radio control of most radio features – including waterfall display
- Built in logbook with usual features and integrations to LOTW, QRZ, eQSL, CloudLog etc.
- Hardware support for tuning controls & buttons and keys/paddles
- DX Cluster support
- POTA spotting
- Built in FT8 / FT4 / PSK-Reporter
- CW Keyer/Decoder
- WeFax
- SSTV

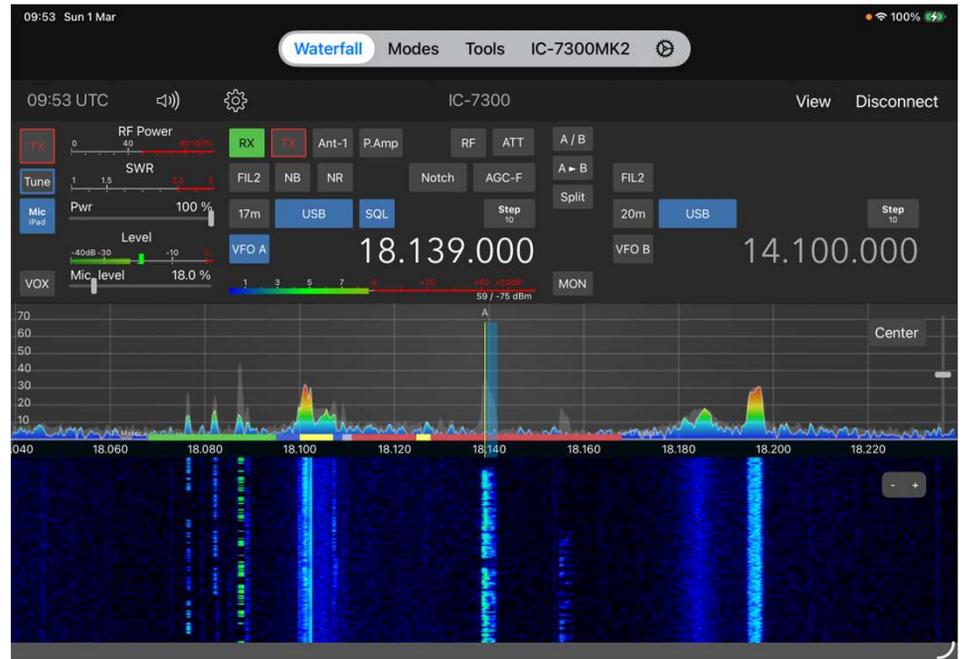
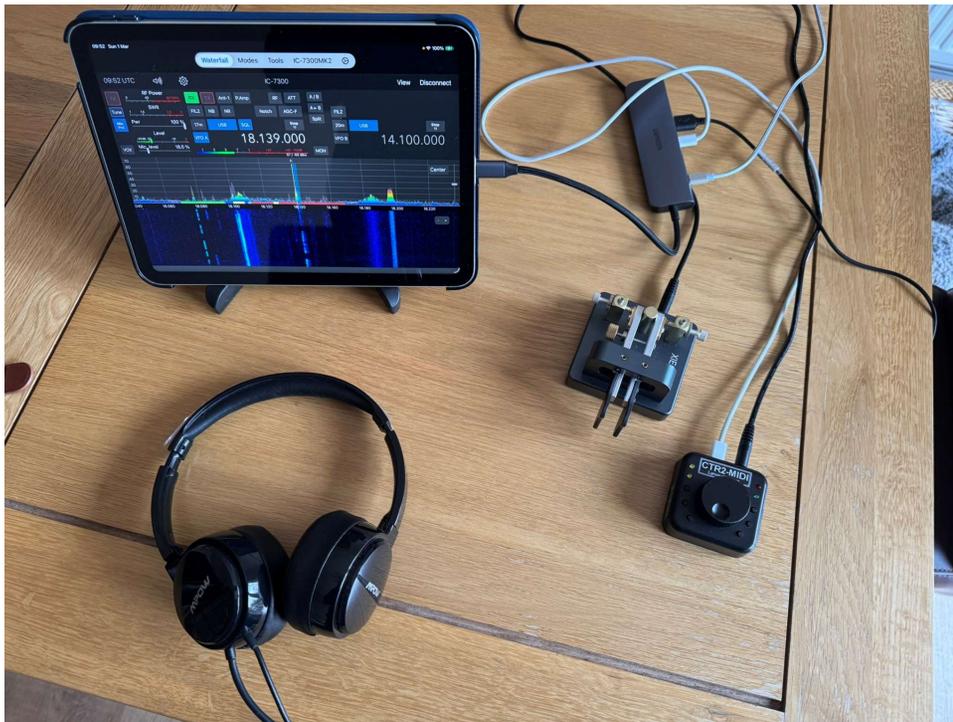
Note: doesn't support straight cw keys  
Only paddles.





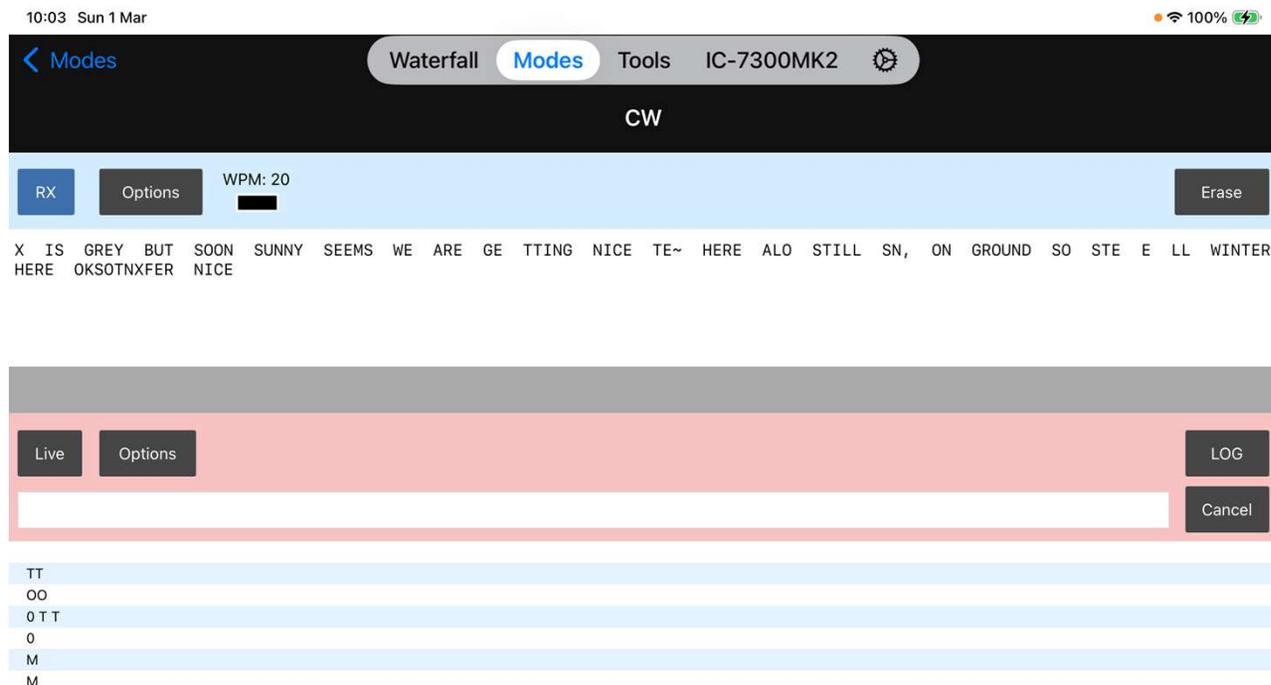
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# Remote station with iPad etc..





# Operating CW



CW Mode has built in decoder which is pretty good when tuned to the correct audio freq. A tuning UI helper would be a nice addition.

Also built in keyer for non-CW operators or those who prefer to use memories for automation.

Paddle interface if using Midi Controller etc.



# SSTV

Send and Receive SSTV

14:22 Sun 1 Mar 100% 🔋

Waterfall Modes Tools IC-7300MK2 ⚙️

SSTV ⚙️

RX Mode: Scottie S2 Adjust: ⏪ ⏩ ↕️ ⏴ ⏵ ⏶ ⏷ Save

F4ETS MMSSTV Ver 1.13  
IUØSCE  
595  
F4ETS

TX Mode: Martin M1 My ID: G6GEI His ID: F4ETS Log Load

RX Stopped



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# FT4 / FT8

Built in FT4 & FT8

Automatically logs  
(option).

Remembers worked  
before etc.

Can report to PSK  
Reporter

14:30 Sun 1 Mar 100%

< Modes Waterfall Modes Tools IC-7300MK2 ⚙ 🔍 Map 🔄

**FT8**

RX 20m (14074.0 kHz) FT8 FT4 Auto Erase

UTC	dB	DT	Freq	Message	
142800	-15	0.2	913	~ CQ LA3YNA/MM	Norway
142830	-25	0.1	959	~ CQ BD1TX OM99	China
143000	-18	0.1	1870	~ CQ CN8NS IM63	Morocco

Tx Odd RX: 1751 TX: 934 ... DX:  Rep:  CQ 1: Waiting LOG

142845	TX	934	~	EA7KRZ G6GEI R-5	
142915	TX	934	~	EA7KRZ G6GEI R-5	
142945	TX	934	~	EA7KRZ G6GEI R-5	
143000	-5	0.7	1751	~ G6GEI EA7KRZ RR73	Spain
143015	TX	934	~	EA7KRZ G6GEI 73	
143015			~	QSO finished with 73	



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# Logging

- Built in logging.
- Simple to use.
- Saves to local device or the cloud.
- Can export ADIF
- Contest mode
- Custom Fields
- Lookup v QRZ.COM or HamQTH.
- UDP Broadcast to other logging s/w (I use Log4OM)
- WSJT-X broadcast decode and log.
- Logs POTA details

14:35 Sun 1 Mar 100%

Tools Waterfall Modes Tools IC-7300MK2

Logbook - iCloud

584 Logbook entrie(s) Map

2026-03-01 14:28:44	EA7KRZ	14.074934	20M FT8	RST sent: -05	Rcvd: -16
2026-03-01 07:52:59	OM8FR	18.101296	17M FT8	RST sent: -04	Rcvd: -17
2026-03-01 07:19:07	RN6MA	18.101296	17M FT8		
2026-03-01 06:58:44	ES1IND	14.075296	20M FT8		
2026-03-01 06:57:15	SP9RZC	14.075296	20M FT8		
2026-03-01 05:34:14	EB3ENW	3.574296	80M FT8		
2026-03-01 05:32:14	DL1VVQ	3.574296	80M FT8		
2026-03-01 05:28:44	DO3VE	3.574296	80M FT8		
2026-03-01 05:26:44	DL9KM	3.574296	80M FT8		
2026-03-01 05:25:14	ON1JP	3.574296	80M FT8		
2026-03-01 05:22:14	DG1GCI	3.574296	80M FT8		
2026-03-01 05:19:29	YO8RAW	3.574296	80M FT8		
2026-03-01 05:17:29	SH7LH	3.574296	80M FT8		

OM35SCBR Slovak Republic  
1343.3 Km / 834.7mi 101.9° / 2...

59 59

14225.000 14225.000

USB Not worked before

2026-03-01 14:34:15 - 14:34:15

POTA SK-0261@SK-KI

Clear Close Save

Sort: Date Down



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- Reads POTA spots from POTA.app
- Filter by Band/Mode
- Tap a spot to tune VFO to freq and prep a log entry.
- POTA Spots appear labelled on the waterfall.
- I always use this when in a park – shame it can't self spot....

# POTA

14:32 Sun 1 Mar 100%

**< Tools** Waterfall Modes **Tools** IC-7300MK2 Stop

POTA

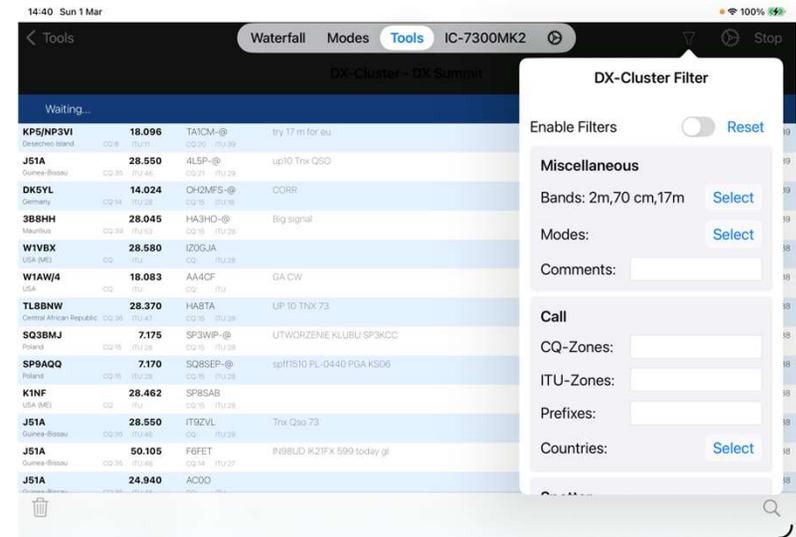
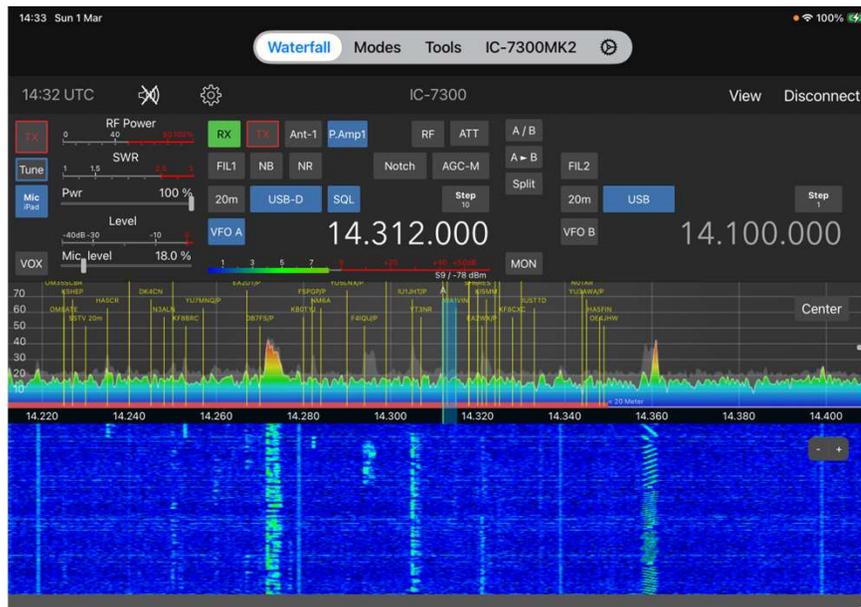
		Map
<b>F4IQU/P</b> FR-11403@FR-BRE	<b>14.294 SSB</b> 59 in JO93fn 73s SP2EWQ via POTACAT	SP2EWQ 7 sec ago
<b>KC1PSK</b> US-1729@US-CT	<b>14.324 SSB</b> 56 Southernmost Illinois. Thanks, I needed CT for my ticket !!!	KB9VKY 17 sec ago
<b>AB4WP</b> US-4624@US-FL	<b>14.250 SSB</b> 57 Houston, Texas. 73	KA5YIX 23 sec ago
<b>KK6CKK</b> US-3534@US-CA	<b>21.300 SSB</b> 55 IN FL LOTS OF QRM	N3MAV 43 sec ago
<b>K8BSR/17</b> US-1575@US-MD	<b>7.187 SSB</b>	N4RDJ 48 sec ago
<b>KB3WAV</b> US-1575@US-MD	<b>7.187 SSB</b>	N4RDJ 54 sec ago
<b>OM35SCBR</b> SK-0261@SK-KI	<b>14.225 SSB</b> 59	S55G 56 sec ago
<b>K1MCO</b> US-1893@US-FL	<b>21.315 SSB</b> 57 costarica	TI2CMM 59 sec ago
<b>NOTAR</b> US-6981@US-RI	<b>14.344 SSB</b> QRV	NOTAR 1 mins ago
<b>DM2PF</b> DE-1154@DE-BW	<b>7.184 SSB</b> QSY	DM2PF 1 mins ago
<b>IU1JHT/P</b> IT-1369@IT-LG	<b>14.305 SSB</b> QRV	IU1JHT/P 1 mins ago
<b>DL2SSB</b> DE-1173@DE-NW	<b>14.312 SSB</b> 59 in JO93fn 73s SP2EWQ via POTACAT	SP2EWQ 1 mins ago
<b>W4OGW</b> US-1293@US-VA	<b>14.185 SSB</b>	N4RDJ 1 mins ago



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# DX CLUSTER

- Built in DX-Cluster view.
- Filter by band / mode / zone etc...
- Tap call to tune VFO
- List of pre-defined servers or add your own.



- Cluster spots appear on the waterfall.

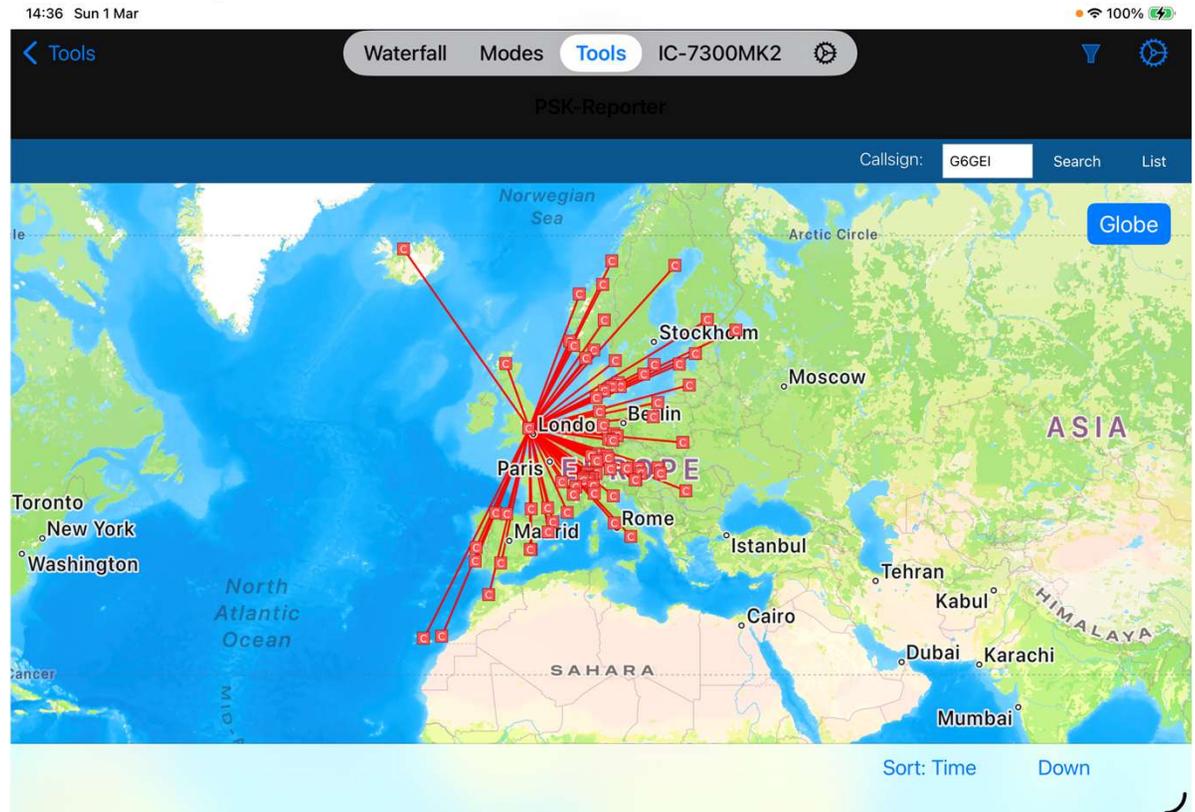


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# PSK-Reporter

- See where you or others have been heard
- Filter by band/mode
- Map or List view.
- Gives details of each spot in list view.





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## Alternative Ideas

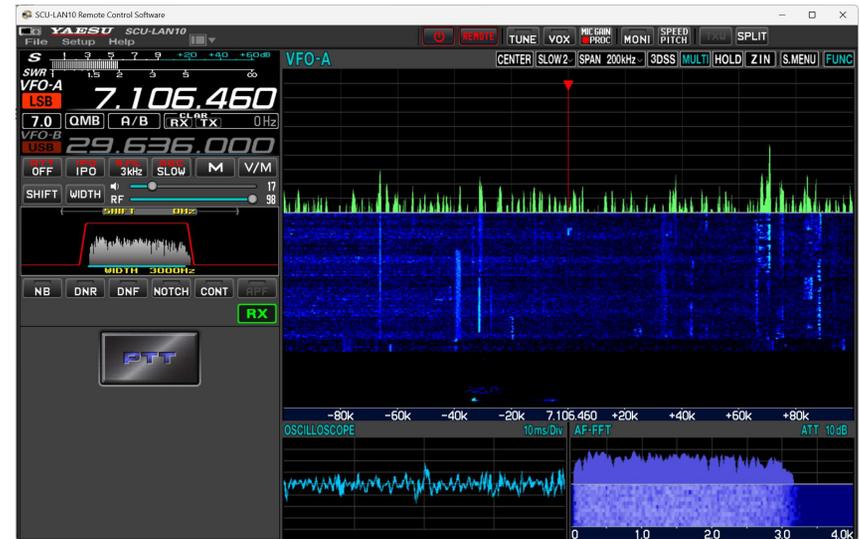
I have also played with the Yaesu **SCU-LAN10** remote software, which is nice to use and works well for voice but doesn't seem to allow remote operation of data modes as the audio is not routed/accessible outside the app.

I would consider just using the shack PC remotely (**RDP** etc.) which will allow all normal desktop apps to be used. Not sure how the CW option/keyer would work.

The PC can be set to auto start when mains is applied, but am wary of pulling power on the PC if unable to do a clean shut-down first, and don't like leaving the PC on.

I have also used Win4Icom. Allows for remote control over IP but requires a PC at the shack. It can send/rx audio though which allows remote data mode apps like WSJTX etc.

Also look at VBAN, a network version of VBAUDIO (Virtual audio adapters) for connecting remote software to audio in/out.





# References

Rotator controller – <http://www.af6sa.com>

The relays in the antenna switch are Teledyne RF Coax Relay Switch SP6T 0-18GHz 60dB Model CCR-38S26C-T and available on eBay, I paid about £60 each.

HAM Radio Apps by DL8MRE <https://ham-radio-apps.com/>

Lynovation CTR2 Midi controller (tuning dial) <https://ctr2.lynovation.com/ctr2-midi/>

Win4icom suite <https://icom.va2fsq.com/remote-control/>

VBAN Audio Network over IP <https://vb-audio.com/Voicemeeter/vban.htm>



# In Action

Let's have some hands-on play time !